ATTACHMENT - CLAIMS LISTING

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) A strain gauge, comprising:

a silicon strain sensing element for sensing strain and having first and second load points;

wherein said strain sensing element includes a portion that couples said first and second load points along an indirect path, and has a pair of piezo-resistors located between said load points such that, when said strain sensing element is subjected to tension or compression at said load points that urges said first and second load points towards or away from each other, said portion respectively extends or bends, simultaneously subjecting a first of said pair of piezo-resistors to compression and a second of said pair of piezo-resistors to tension thereby inducing a change in relative resistance of said pair of piezo-resistors.

2. (Original) A strain gauge as claimed in claim 1, wherein said strain sensing element comprises a curved silicon member.

3. (Original) A strain gauge as claimed in claim 2, wherein said curved silicon member comprises a circular ring or annulus.

4. (Original) A strain gauge as claimed in claim 1, wherein the strain sensing element has a shape selected from the group of an ellipse, an oval, one or more curves with one or more straight portions, a "V" shape and a zig-zag member.

5. (Original) A strain gauge as claimed in claim 1, wherein the strain sensing element comprises two or more load points and respective sets of piezo-resistors between each respective pair of load points.

6. (Previously Presented) A strain gauge as claimed in claim 5, wherein the strain sensing element comprises a ring with two load points and two pairs of piezo-resistors.

7. (Original) A strain gauge as claimed in claim 5, comprising three load points and three pairs of piezo-resistors.

8. (Original) A strain gauge as claimed in claim 3, comprising a plurality of load points spaced substantially equidistantly around the perimeter of said ring or annulus.

9. (Original) A strain gauge as claimed in claim 1, comprising a plurality of strain sensing elements.

10. (Original) A strain gauge as claimed in claim 9, wherein each of said strain sensing elements include at least one load point coupled to a load point of another of said strain sensing elements.

11. (Original) A strain gauge as claimed in claim 9, comprising a plurality of strain sensing elements arranged linearly, each having a load point coupled to or common with a load point of any adjacent one or more of said strain sensing elements.

12. (Original) A strain gauge as claimed in claim 1, comprising a detector responsive to changes in the relative resistance of said pair of piezo-resistors.

13. (Original) A strain gauge as claimed in claim 1, wherein said strain sensing element is provided with two pairs of piezo-resistors, arranged so as to constitute a Wheatstone Bridge.

14. (Original) A strain gauge as claimed in claim 1, wherein the strain sensing element is provided with a plurality of pairs of piezo-resistors, arranged so as to constitute a

Wheatstone Bridge, and the gauge includes a current or potential sensitive device arranged to respond to changes in the relative resistance of said piezo-resistors.

15. (Previously Presented) A strain gauge as claimed in claim 1, wherein said strain sensing element is connected to the load points by silicon tethers.

16. (Original) A strain gauge as claimed in claim 1, further including an external structure, a plurality of connection points and a plurality of compliant tethers, wherein said connection points comprise or are mechanically coupled to said load points, and said tethers are arranged to tether said connection points to said external structure with each of said connection points coupled to said external structure by at least one of said tethers to locate said strain sensing element within said external structure.

17. (Original) A strain gauge as claimed in claim 16, wherein said tethers are sufficiently compliant so that a load required to bend said tethers is small compared with a load required to distort said strain sensing element.

18. (Original) A strain gauge as claimed in claim 16, wherein said external structure comprises a silicon frame.

19. (Original) A strain gauge as claimed in claim 16, wherein said connections points comprise or are coincident with said load points.

20. (Original) A strain gauge as claimed in claim 16, wherein said tethers provide a platform for or constitute an electrical connection between said external structure and said strain sensing element.

21. (Original) A strain gauge as claimed in claim 16, wherein said tethers comprise silicon.

22. (Original) A strain gauge as claimed in claim 16, wherein said external structure includes other piezo-resistors fabricated on parts of said external structure so that said external structure can be used as a temperature sensor.

23. (Original) A strain gauge as claimed in claim 22, wherein said other piezo-resistors are used in temperature correction for the piezo-resistors of said strain sensing element.

24. (Previously Presented) A strain gauge as claimed in claim 23, comprising a voltage source for applying a bias voltage between said strain sensitive piezo-resistors of said strain sensing element and said external structure or a doped well in order to control response of said strain sensitive piezo-resistors.

25. (Original) A strain gauge as claimed in claim 24, including conductive tracks to said connection points so that material may be electro-deposited at said connection points to provide additional functionality at said connection points.

26. (Original) A strain gauge as claimed in claim 25, including material electro-deposited at at least one of said connection points to form a raised point at said respective connection point for bonding to an external structure for the purposes of monitoring strain in said external structure.

27. (Original) A strain gauge as claimed in claim 24, further comprising at least one electrical circuit fabricated on a wafer on which the strain gauge is manufactured to control processing of the wafer.

28. (Original) A strain gauge as claimed in claim 27, wherein said at least one electrical circuit controls processing of electro-deposition.

29. (Previously Presented) A strain gauge, comprising:

a silicon strain sensing element for sensing strain and having first and second load points;

an external structure;

a plurality of connection points; and

a plurality of compliant tethers;

wherein said strain sensing element includes a portion that couples said first and second load points along an indirect path, and has a pair of piezo-resistors located between said load points such that, when said strain sensing element is subjected to tension or compression at said load points, said portion respectively extends or bends subjecting a first of said pair of piezo-resistors to compression and a second of said pair of piezo-resistors to tension thereby inducing a change in relative resistance of said pair of piezo-resistors; and

wherein said connection points comprise or are mechanically coupled to said load points, and said tethers are arranged to tether said connection points to said external structure with each of said connection points coupled to said external structure by at least one of said tethers to locate said strain sensing element within said external structure.

30. (Previously Presented) A strain gauge as claimed in claim 29, wherein said tethers are sufficiently compliant so that a load required to bend said tethers is small compared with a load required to distort said strain sensing element.

31. (Previously Presented) A strain gauge as claimed in claim 29, wherein said external structure comprises a silicon frame.

32. (Previously Presented) A strain gauge as claimed in claim 29, wherein said connections points comprise or are coincident with said load points.

33. (Previously Presented) A strain gauge as claimed in claim 29, wherein said tethers provide a platform for or constitute an electrical connection between said external structure and said strain sensing element.

34. (Previously Presented) A strain gauge as claimed in claim 29, wherein said tethers comprise silicon.

35. (Previously Presented) A strain gauge as claimed in claim 29, wherein said external structure includes other piezo-resistors fabricated on parts of said external structure so that said external structure can be used as a temperature sensor.

36. (Previously Presented) A strain gauge as claimed in claim 35, wherein said other piezo-resistors are used in temperature correction for the piezo-resistors of said strain sensing element.

37. (Previously Presented) A strain gauge as claimed in claim 36, comprising a voltage source for applying a bias voltage between said strain sensitive piezo-resistors of said strain sensing element and said external structure or a doped well in order to control response of said strain sensitive piezo-resistors.

38. (Previously Presented) A strain gauge as claimed in claim 37, including conductive tracks to said connection points so that material may be electro-deposited at said connection points to provide additional functionality at said connection points.

39. (Previously Presented) A strain gauge as claimed in claim 38, including material electro-deposited at at least one of said connection points to form a raised point at said respective connection point for bonding to an external structure for the purposes of monitoring strain in said external structure.

40. (Previously Presented) A strain gauge as claimed in claim 37, further comprising at least one electrical circuit fabricated on a wafer on which the strain gauge is manufactured to control processing of the wafer.

41. (Previously Presented) A strain gauge as claimed in claim 38, wherein said at least one electrical circuit controls processing of electro-deposition.

42. (New) A strain gauge, comprising:

a plurality of strain sensing elements for sensing strain, each having respective first and second load points;

wherein each of said strain sensing elements includes a portion that couples said respective first and second load points along an indirect path, and a pair of piezo-resistors located between said load points such that, when said strain sensing element is subjected to tension or compression at said load points, said portion respectively extends or bends, simultaneously subjecting a first of said pair of piezo-resistors to compression and a second of said pair of piezo-resistors to tension thereby inducing a change in relative resistance of said pair of piezo-resistors; and

wherein each of said strain sensing elements includes at least one load point coupled to or common with a load point of another of said strain sensing elements.

43. (New) A strain gauge as claimed in claim 42, wherein said strain sensing elements are arranged linearly.

44. (New) A strain gauge, comprising:

a silicon strain sensing element for sensing strain and having first and second load points;

wherein said strain sensing element includes a portion that couples said first and second load points along an indirect path, and has a pair of piezo-resistors located between said load points such that, when said strain sensing element is subjected to tension or compression at said load points, said portion respectively extends or bends,

simultaneously subjecting a first of said pair of piezo-resistors to compression and a second of said pair of piezo-resistors to tension thereby inducing a change in relative resistance of said pair of piezo-resistors; and

wherein said strain sensing element is connected to the load points by silicon tethers.

45. (New) A strain gauge as claimed in claim 1, wherein said strain sensing element is substantially planar and said strain gauge is adapted to gauge a load parallel to or co-planar with said strain sensing element.